

TECHNICAL REPORT TITLE PAGE

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Development of Bridge Load Testing Process for Load Evaluation	Final Report, May 2000 to February 2003
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8. ABSTRACT	
<p>Recent reports indicate that of the over 25,000 bridges in Iowa, slightly over 7,000 (29 %) are either structurally deficient or functionally obsolete. While many of these bridges may be strengthened or rehabilitated, some simply need to be replaced. Before implementing one of these options, one should consider performing a diagnostic load test on the structure to more accurately assess its load carrying capacity. Frequently, diagnostic load tests reveal strength and serviceability characteristics that exceed the predicted codified parameters. Usually, codified parameters are very conservative in predicting lateral load distribution characteristics and the influence of other structural attributes. As a result, the predicted rating factors are typically conservative. In cases where theoretical calculations show a structural deficiency, it may be very beneficial to apply a "tool" that utilizes a more accurate theoretical model which incorporates field-test data. At a minimum, this approach results in more accurate load ratings and many times results in increased rating factors. Bridge Diagnostics, Inc. (BDI) developed hardware and software that is specially designed for performing bridge ratings based on data obtained from physical testing.</p> <p>To evaluate the BDI system, the research team performed diagnostic load tests on seven "typical" bridge structures: three steel-girder bridges with concrete decks, two concrete slab bridges, and two steel-girder bridges with timber decks. In addition, a steel-girder bridge with a concrete deck previously tested and modeled by BDI was investigated for model verification purposes. The tests were performed by attaching strain transducers on the bridges at critical locations to measure strains resulting from truck loading positioned at various locations on the bridge.</p> <p>The field test results were used to develop and validate analytical rating models. Based on the experimental and analytical results, it was determined that bridge tests could be conducted relatively easy, that accurate models could be generated with the BDI software, and that the load ratings, in general, were greater than the ratings obtained using the codified LFD Method (according to AASHTO Standard Specifications for Highway Bridges).</p>	
9. KEY WORDS	10. NO. OF PAGES
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